IN THE SPECIFICATION

Please amend the paragraph at page 1, lines 18-20, as follows:

When developing a semiconductor device such as an ASIC, a semiconductor device developer studies specifications, cost, schedule, etc., related to the device in advance, determines makers, and starts materializing the device. The definition of a "maker" is set forth below.

Please amend the paragraph at page 1, lines 26-32, as follows:

Conventionally, a developer chooses a general LSI maker who carries out designing to testing of a semiconductor device. The general LSI maker asks specialized makers such as electronic design automation (EDA) tool makers, silicon foundries, assemblers, etc., to produce a required semiconductor device. Developers have no chance to choose such specialized makers directly or through general LSI makers. The general LSI makers choose specialized makers for that fit to their convenience. It is difficult for the developers to select specialized makers who have the having latest manufacturing technology.

Please amend the paragraph at page 1, line 35 to, page 2, line 1, as follows:

The present invention provides a method of assisting in the placing, managing, and receiving of an order for manufacturing a semiconductor device. The present invention also provides an apparatus, a program, and a data structure related to the method.

Please amend the paragraph at page 2, lines 2-5, as follows:

The present invention provides an apparatus for assisting in the placing of an order for manufacturing a semiconductor device, having a maker registering unit for registering makers

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that are interfaced to one another and a maker introducing unit for introducing interfaced

makers.

Please amend the paragraph at page 2, lines 10-11, as follows:

The maker introducing unit includes a maker retrieving unit for retrieving maker

groups that are capable of manufacturing a semiconductor device having ~~of~~ given

specifications.

Please amend the paragraph at page 3, lines 16-19, as follows:

In step S1, a semiconductor device developer prepares the specifications of a

semiconductor device to ~~develop~~ be developed. In step S2, a logic designer prepares a logic

design for the semiconductor device according to the specifications. In step S3, a mask

designer prepares masks according to the logic design.

Please amend the paragraph at page 3, lines 23-30, as follows:

Between the logic designer of step S2 and the mask designer of step S3, there is a

design-layout interface. The "interface" is an environment or a connection through which an

intermediate result (such as logic circuit data provided by the logic designer) is handed over

from one maker to another in the semiconductor device manufacturing flow. The interface

enables a maker to smoothly receive and process an intermediate result from a maker in the

preceding step. An intermediate result handled by the design-layout interface is logic circuit

data that must be prepared so that ~~as to make~~ the mask designer properly prepare a layout of

masks.

Please amend the paragraph at page 3, lines 31-35, as follows:

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Between the mask designer of step S3 and the silicon foundry of step S4, there is a

layout-silicon interface. This interface handles photomasks as an intermediate result. The

photomasks must be produced so that they are usable to make silicon chips from a silicon

wafer. For example, the photomasks must maintain keep-processible process minimum

dimensions for wafers.

Please amend the paragraph at page 3, line 36 to, page 4, line 3, as follows:

Between the silicon foundry of step S4 and the assembler of step S5, there is a silicon-

package interface. This interface handles silicon chips as an intermediate result. The silicon

chips must be produced so that they may properly be packaged. For example, pad intervals

on a silicon chip must have keep minimum intervals for bonding wires.

Please amend the paragraph at page 4, lines 4-8, as follows:

Between the assembler of step S5 and the tester of step S6, there is a package-test

interface. This interface involves semiconductor devices provided by the assembler and the

logic circuit data provided by the logic designer. The semiconductor devices must be

packaged to ensure secure intended operations. For example, pins formed on a package must

agree with sockets on a test board.

Please amend the paragraph at page 4, lines 9-11, as follows:

These four interfaces are essential to fabricate a semiconductor device. Without any

one of the interfaces, the semiconductor manufacturing steps will not smoothly advance and

will cause a problem trouble in finished products due to inconsistency among the steps.

Please amend the paragraph at page 4, lines 12-17, as follows:

The logic designer, mask maker, silicon foundry, assembler, and tester may be separate makers specialized in their categories. If there is no general LSI maker mediating between such makers, one may form maker groups, each involving the four interfaces mentioned above, to enable a semiconductor device developer to select one of the maker groups and ask the selected maker group to manufacture a semiconductor device developed by the developer.

Please amend the paragraph at page 4, lines 21-25, as follows:

Figure 2 shows an example of a computer network with which a method of assisting the placing of an order for manufacturing a semiconductor device, according to an embodiment of the present invention, is achieved. The network 2 includes a server 1 and terminal computers 3 to 16, the server and computers being connected to the network 2 through telephone lines.

Please amend the paragraph at page 4, lines 26-35, as follows:

Figure 3 shows an illustrative structure of the server 1 controlled by a platform provider. The "platform provider" is one who mediates between a semiconductor device developer and semiconductor device makers in specialized categories. The server 1 includes a controller 21, an input controller 22 connected to the controller 21 and network 2, an output controller 23 connected to the controller 21 and the network 2, main program storage 24 connected to the controller 21, maker file storage 25 connected to the controller 21, interface file storage 26 connected to the controller 21, and developer file storage 27 connected to the controller 21. The controller 21 may be a central processing unit (CPU) to read a main program from the storage 24 and control the storages 24 to 27 and controllers 22 and 23.

Please amend the paragraph at page 6, lines 3-12, as follows:

Figure 9 shows an essential data structure of an interface file 72 stored in the storage 26. The interface file 72 maintains keeps a registration number, a group of makers who previously manufactured a semiconductor device, and categories to which the makers belong. The interface file 72 has an area 77 for categories. Each category is related to a maker's name and performance indices indexes. The performance indices indexes include TATs, unit prices, and numbers and are kept in areas 78, 79, 80, and 81 in the interface file 72. The maker name area 78 is related to the category area 77 so that maker names are related to categories, respectively. To relate maker names with performance indices indexes, the maker name area 78 is related to the index areas 79 to 81. The interface file 72 may contain total prices charged to developers.

Please amend the paragraph at page 6, lines 13-25, as follows:

Figure 10 shows an essential data structure of a developer file 73 stored in the storage 27 and 65. The developer file 73 keeps a developer registration number, a developer name, the functions, delivery data, price, specifications of a semiconductor device manufactured or to be manufactured, and the names and TATs (turnaround times) of makers related to the manufacturing of the semiconductor device. The developer file 73 has an area 82 for recording a developer's name, the name of a semiconductor device developed by the developer, and related labels. The developer file 73 also has an area 83 for keeping specifications, an area 84 for keeping categories, an area 85 for keeping maker names, and an area 86 for keeping TATs. The developer name area 82 is related to the specification area 83 so that the specifications may be listed in connection with the developer name. The maker name area 85 is related to the category area 84, to relate categories to maker names,

respectively. The maker name area 85 is related to the TAT area 86, to relate maker names to

TATs, respectively.

Please amend the paragraph at page 6, lines 26-30, as follows:

The maker names in the developer file 73 may be the same as ~~equal to~~ those in the

interface file 72. The developer file 73 contains the developer's name, specifications, etc.,

that must be kept confidential. Accordingly, the interface file 72 is prepared by extracting

not-confidential data from the developer file 73, so that the interface file 72 may be disclosed

to every developer.

Please amend the paragraph at page 6, line 32, as follows:

Steps performed ~~taking place~~ among platform provider, developer, and makers

Please amend the paragraph at page 7, lines 1-14, as follows:

First, the steps carried out by a platform provider will be explained. The platform

provider uses the computer network 2 to assist a developer to develop and manufacture a

semiconductor device. The steps carried out by the platform provider include inviting makers

who want to manufacture semiconductor devices in collaboration with registered makers of

other categories, and introducing registered makers to developers who want to develop and

manufacture specific semiconductor devices. In this specification, the "maker" is any firm or

person classified ~~into~~ one of semiconductor device manufacturing categories including logic

designing, mask making, silicon foundry, chip assembling, packaging, and testing. The

makers are represented by ~~with~~ names, labels, or registration numbers that are stored in, for

example, the storage 25 connected to the network 2. The categories into which the makers

are classified are not limited to those shown in Fig. 1. Any type of classification is applicable

to the present invention. For example, the logic designing and mask making may be classified into one category, or the mask making may be classified into mask designing and mask production.

Please amend the paragraph at page 7, lines 23-27, as follows:

In step S14 of Fig. 11, the maker enters a category to which the maker belongs. In step S15, the platform provider prompts the maker to enter makers of other categories with which the maker wants to be interfaced, i.e., with which the maker wants to collaborate in the manufacture a semiconductor device in collaboration. At this time, the maker is asked to enter one maker for one category.

Please amend the paragraph at page 8, lines 1-6, as follows:

In step S20 of Fig. 11, the maker determines who bears the interfacing cost. In step S21, the platform provider asks the maker in question and the makers with which the maker in question wants to be interfaced to produce a sample semiconductor device used to confirm the correctness of interfaces among the makers. The sample may be the semiconductor device requested by the developer. At this time moment, the interface confirming unit 34 of Fig. 4 terminates the interface confirming procedure 44 of Fig. 5.

Please amend the paragraph at page 8, lines 7-13, as follows:

In steps S22 and S23 of Fig. 11, the makers fabricate the sample semiconductor device. If the sample produced by the makers is verified to operate as specified, the makers are admitted as an interfaced maker group that is capable of manufacturing the semiconductor device in collaboration with others. The maker in question requests, in step S25, the platform provider to register the concerned makers concerned as an interfaced maker group. In step

S24, the platform provider registers the makers as an interfaced maker group. This completes the maker registering step.

Please amend the paragraph at page 8, lines 17-22, as follows:

In step S31, the platform provider shows maker interfaces. In step S33, the platform provider introduces registered makers to the developer. Through steps S31 and S33, the developer obtains ~~gets~~ the names of makers to which the developer can ask to manufacture a semiconductor device. In step S34, the developer sends its intention to proceed ~~go farther~~. At this time, the specification assisting unit 37 of Fig. 4 terminates the specification assisting procedure 47 of Fig. 5.

Please amend the paragraph at page 9, lines 6-11, as follows:

Referring to Fig. 13, the platform provider receives the selected maker group from the developer and prompts, in step S44, the developer to determine whether or not delivery dates must be fixed. At this time, the scheduling unit 40 of Fig. 4 starts the scheduling procedure 50 of Fig. 5. Each maker in the selected maker group will be provided with a delivery date on which the maker must hand over its product to the next maker, to complete a given semiconductor device in the maker group in collaboration with each other.

Please amend the paragraph at page 9, lines 26-29, as follows:

In step S52, the developer determines whether or not the delivery dates must be reserved. If the delivery dates ~~they~~ must be reserved, the platform provider informs, in step S53, each maker of the delivery date to be reserved. At this time, the scheduling unit 40 of Fig. 4 terminates the scheduling procedure 50 of Fig. 5. This completes the maker introducing step.

Please amend the paragraph at page 9, line 33 to, page 10, line 10, as follows:

~~For the developers, the~~ The present invention enables the developers ~~them~~ to set up optimum designing and developing environments to determine ~~find out~~ the best solution, and therefore, the developers can develop highly marketable semiconductor devices at low risk and low cost in a short time. With the present invention, the developers can select makers having specialized techniques to develop semiconductor devices. It is possible for the developers to determine makers after fixing the specifications of a semiconductor device, so that the developers may concentrate on developing semiconductor devices. At the same time, the present invention prompts ~~promotes~~ makers to disclose their methods, costs, schedules, standard design techniques, etc., to expand choices for the developers. Also, the present invention promotes the disclosure of design tools from electronic design automation (EDA) tool makers because these tool makers ~~they~~ are eager to establish a common LSI developing platform with their own tools. This further expands choices for the developers. The present invention also promotes the disclosure of libraries from silicon foundries and assemblers~~.~~ ~~This~~ so as to additionally ~~expands~~ expand choices for the developers.

Please amend the paragraph at page 10, lines 19-21, as follows:

The present invention improves ~~its~~ efficiency by classifying makers into categories including logic designing, mask making, silicon foundry, assembling, and testing and by making maker groups based on the categories.

Please amend the paragraph at page 12, line 16, as follows:

Detailed steps performed ~~taking place~~ among platform provider, developer, and makers

Please amend the paragraph at page 12, line 27 to, page 13, line 11, as follows:

In step S11, the platform provider manipulates the server 1 of Fig. 2 to invite the maker to register. The maker manipulates the computer 3. The invitation from the platform provider is sent from the server 1 to the computer 3 through the network 2 and is displayed on the computer 3. In response, the maker manipulates the computer 3 to request registration. More precisely, the server 1 of the platform provider activates the controller 21 of Fig. 3. The controller 21 reads the main program 29 of Fig. 5 from the storage 24. According to the main program 29, the maker registering unit 31 in the controller 21 starts the maker registering procedure 41. Thereafter, the maker inviting unit 32 in the controller 21 starts the maker inviting procedure 42. The maker inviting unit 32 instructs the output controller 23 to display a document view of Fig. 14 on the display 56 of the computer 3. The output controller 23 converts the instruction into a signal transmittable through the network 2 and sends the signal to the computer 3. The input controller 52 of the computer 3 receives the signal, converts the signal into an instruction operable on the controller 51, and sends the instruction to the controller 51. In response to the instruction, the controller 51 displays the document view of Fig. 14 on the display 56. The input controllers 22 of Fig. 3, 52 of Fig. 6, and 62 of Fig. 7 achieve the same function. The output controllers 23 of Fig. 3, 53 of Fig. 6, and 63 of Fig. 7 achieve the same function. These controllers and functions provide ~~realize~~ communication among the server 1 and computers 3 through 16. In the following explanation, instructions and data are transferred among the controllers 21, 51, and 61 through the input and output controllers 22, 23, 52, 53, 62, and 63 even if not particularly mentioned.

Please amend the paragraph at page 13, lines 14-19, as follows:

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In step S12 of Fig. 11, the maker requests the platform provider to register. More precisely, the maker <u>selects</u> ~~pushes~~ a button "Register" of Fig. 14 with the input unit 57 which may be a mouse or a keyboard. The signal from the input unit 57 is transferred to the controller 51 and to the controller 21, which informs the platform provider of the registration request of the maker. At this time, the maker inviting unit 32 terminates the maker inviting procedure 42.

Please amend the paragraph at page 14, lines 14-30, as follows:

The platform provider prompts the maker to confirm the makers to be interfaced. The controller 21 instructs the controller 51 to display a document view of Fig. 17 on the display 56. The document view of Fig. 17 shows the maker 4B in question, an arrow mark from the maker 3A to the maker 4B, and an arrow mark from the maker 4B to the maker 5A. The document view also shows a message of "A route to be registered is as follows: 2A-3A-4B-5A-6A. Is it OK?" This message prompts the maker to confirm if the displayed maker interfacing is the desired <u>interface</u> ~~one~~. If it is wrong, the maker <u>selects</u> ~~pushes~~ a button "Reregister." If it is correct, the maker <u>selects</u> ~~pushes~~ a button "OK." In this example, the maker <u>selects</u> ~~pushes~~ the button "OK" through the input unit 57, which sends an OK signal to the controller 51 and to the controller 21. As a result, the platform provider acknowledges that the maker interfacing now being displayed is the <u>interface</u> ~~one~~ the maker desires and organizes a maker group of the makers 2A, 3A, 4B, 5A, and 6A. There is an already organized maker group of the makers 2A, 3A, 4A, 5A, and 6A who are already interfaced with one another and are capable of manufacturing semiconductor devices in collaboration with one another. The newly organized maker group 2A-3A-4B-5A-6A is not yet interfaced, and therefore, it is not clear whether or not they can manufacture semiconductor devices in collaboration with one another.

Please amend the paragraph at page 15, lines 17-26, as follows:

By bearing the interfacing cost, the maker can form an interface without waiting for a developer who wants to share the interfacing cost, and therefore, can quickly introduce the maker's products into the market. By sharing the interfacing cost with a developer, the maker can form an interface while manufacturing a semiconductor device developed by the developer, and therefore, the interfacing cost borne by the maker and the manufacturing cost borne by the developer will be reduced. In addition, the developer may adopt the latest techniques provided by makers, to develop a high-performance semiconductor device. The sharing of an interfacing cost, however, involves a risk of failing to establish a proper interface for a semiconductor device developed by the developer. In this case, the maker and developer are obliged to bear the risk.

Please amend the paragraph at page 16, line 29 to, page 17, line 3, as follows:

Figure 22 shows registration of new makers 2B and 3B. The maker 2B wants to be interfaced with the maker 3B. The maker 3B wants to be interfaced with the makers 4A and 4B. To achieve this, a maker group 2B-3B-4A-5B-6A and a maker group 2B-3B-4B-5B-6A are requested to fabricate sample semiconductor devices, respectively. If the sample semiconductor devices successfully pass tests, the two maker groups are admitted as interfaced maker groups. These two maker groups do not include the maker 5A. Namely, if the makers 2B and 3B are selected, the maker 5A will be excluded. It is presumed that a new maker, who wants to be registered, wants to be interfaced with makers having improved technology. This means that any maker who wants interfacing requests from other makers must maintain the latest technology. This enables the platform provider to provide developers with the latest semiconductor device manufacturing technology.

Please amend the paragraph at page 17, lines 8-21, as follows:

The maker introducing unit 36 of Fig. 4 starts the maker introducing procedure 46 of Fig. 5, and the specification assisting unit 37 starts the specification assisting procedure 47. In step S31 of Fig. 12, the platform provider shows maker interfaces to a semiconductor device developer. The developer manipulates, for example, the computer 16 of Fig. 2. The controller 21 of the server 1 manipulated by the platform provider instructs the controller 61 (Fig. 7) of the computer 16 to display the document view of Fig. 14. This document view includes a button with a message of "Introduction of maker-to-maker interfaces." This message may attract the attention of the developer. The developer selects ~~pushes~~ the button with the input unit 67. The signal from the input unit 67 is transferred to the controller 21 through the controller 61. The controller 21 and platform provider acknowledge the desire of the developer of seeing the maker interfaces. The controller 21 instructs the controller 61 to display a document view of Fig. 25 on the display 66. This document view has buttons of "Simple flowchart" and "Detailed interfaces" so that the developer may select one of the buttons.

Please amend the paragraph at page 17, line 22 to, page 18, line 3, as follows:

If the developer selects the button "Detailed interfaces," the selection is transferred from the input unit 67 to the controllers 61 and 21. The controller 21 instructs the controller 61 to display a document view of Fig. 26 on the display 66 in step S31 of Fig. 12. The document view of Fig. 26 show makers 2A to 6A, 2B to 6B, and 2C to 4C in categories. Labels I1 to I6 and X1 to X4 represent specifications with anonymous developers. Labels O1 to O6 and Y1 to Y4 represent semiconductor devices with anonymous developers. The makers are listed in order of registration dates from left to right. The newer the registration date, the more rightwardly the related maker is positioned in Fig. 26. A T-shaped mark

between vertically adjacent makers represents an interface between the makers. An interface depicted with a solid line is newer than an interface on the left thereof. An interface depicted with a doted line is temporally equal to an interface on the left thereof. The makers 2C, 3C, 4C, and 6B are not interfaced with vertically adjacent makers. This means that these makers want to establish interfaces at shared cost with developers. As mentioned above, the more rightwardly an interface is positioned, the newer the technology the interface involves. From the document view of Fig. 26, the developer can understand grasps makers who are frequently adopted and interfaces that are frequently employed. Namely, in step S32, the developer can understand grasps technical trends related to semiconductor device manufacturing from the document view of Fig. 26 and wants to know the details of attractive makers.

Please amend the paragraph at page 18, lines 4-13, as follows:

If the developer selects the button "Simple flowchart" of Fig. 25, the selected signal is transferred from the input unit 67 to the controllers 61 and 21. The controller 21 instructs the controller 61 to display a document view of Fig. 27 on the display 66 in step S31 of Fig. 12. The document view of Fig. 27 shows the makers 2A to 6A, 2B to 6B, and 2C to 4C in categories. A solid-line arrow between makers indicates an existing interface, and a dotted-line arrow between makers indicates an interface to be established at shared cost with a developer. The more rightwardly a maker is positioned in Fig. 27, the newer the technology the maker may have. A maker to which arrow marks concentrate may have standard technology of the category to which the maker belongs. By studying these characteristics of Fig. 27, the developer may desire to study the details of attractive makers.

Please amend the paragraph at page 19, lines 11-16, as follows:

The controller 21 prompts the developer to ask for a proposal. The controller 21 displays a message of "Click 'Proposal Request' after filling blanks" as shown in Fig. 28. In step S37, the developer selects ~~pushes~~ a button "Proposal Request" of Fig. 28 to request the platform provider to propose maker groups who are able to manufacture the semiconductor device. The request signal is transferred from the input unit 67 to the controller 21 through the controller 61.

Please amend the paragraph at page 19, lines 17-30, as follows:

In step S38 of Fig. 12, the platform provider proposes maker groups in categories to manufacture the semiconductor device developed by the developer. The controller 21 instructs the controller 61 to display a document view of Fig. 29 on the display 66. This document view has a message of "Proposed flow (maker groups)" and columns numbered from 1 to 8. The columns contain maker groups in categories. These maker groups are retrieved and arranged by the platform provider in steps S55 and S56. In Fig. 29, the maker group I2-O2 corresponds to the maker group in the second column from the left in Fig. 26 and is represented with the specification label I2 and completion label O2. Similarly, the maker group I4-O4 corresponds to the maker group in the fourth column from the left, the maker group I6-O6 to the sixth column from the left, and x2-y2 to the eighth column from the left in Fig. 26. These four maker groups retrieved by the platform provider in step S55 each include ~~each~~ the silicon foundry 4B because the developer has desired the silicon foundry 4B in step S36 as shown in Fig. 28. At this time, the maker retrieving unit 38 of Fig. 4 terminates the maker retrieving procedure 48.

Please amend the paragraph at page 21, lines 19-24, as follows:

In step S47 of Fig. 13, the maker 4B determines whether or not the expected start and delivery dates are feasible. If the maker 4B can keep the dates, the maker 4B clicks, in step S48, the button "Possible" of Fig. 33 to inform the controller 21 (the platform provider) of the acceptance of the dates through the controller 51. In this example, the maker 4B wants to change the start and delivery dates and enters preferable dates as shown in Fig. 33. The entered dates are provided ~~informed~~ to the controller 21 through the controller 51.

Please amend the paragraph at page 21, lines 25-34, as follows:

Since the original dates must be adjusted, the controller 21 informs, in step S49 of Fig. 13, the developer's controller 61 of the dates amended by the maker 4B and asks the developer whether the developer will reschedules the delivery dates or selects another maker group. The controller 21 instructs the controller 61 of the computer 16 to display a document view of Fig. 34 on the display 66. This document view has a message of "Rescheduling is requested," the name of the maker who wants to change the delivery dates, desired start and delivery dates, a message of "Do you reschedule?," a button of "Reschedule along maker's request," a button of "Reset the schedule" for resetting the expected start and delivery dates stated in Fig. 28, a button of "Find another route," and a button of "Reject all proposals."

Please amend the paragraph at page 21, line 35 to, page 22, line 3, as follows:

In step S50 of Fig. 13, the developer selects ~~pushes~~ one of the buttons "Reschedule along maker's request," "Reset the schedule," "Find another route," and "Reject all proposals." In this way, the schedule is adjusted among the controller 21 (platform provider), controller 61 (developer), and controllers 51 (makers), to fix a final schedule along which all makers can keep delivery dates.